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IZUI, HIROSHI

NAKAMATSU, TSUYOSHI

<120> BACTERIUM PRODUCING L-GLUTAMIC ACID AND METHOD FOR PRODUCING L-GLUTAMIC ACID

<130> 210213US0

<140> 09/895,382

<141> 2001-07-02

<150> JP 2000-204256

<151> 2000-07-05

<160> 34

<170> PatentIn version 3.1

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ttaaacactc aggaggatcc ttgccggcca aaatcacggc cactcgtccc accccagaat	180
cccttcacgc tggtaagag gaaaccgcag ccggtgcccc caggattgtt gccacctatt	240
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tgcgttacac caaggtcgct tctgaacacg aggaagctca gccaaagaag gctacaaagc	360
ggactcgtaa ggctaccagc taagaaggct gctgctaaga aaacgaccaa gaagaccact	420
aagaaaacta ctaaaaagac caccgcaaaag aagaccacaa agaagtctta agccggatct	480

tat atg gat gat tcc aat agc ttt gta gtt gtt gct aac cgt ctg cca Met Asp Asp Ser Asn Ser Phe Val Val Val Ala Asn Arg Leu Pro	528
1 5 10 15	
gtg gat atg act gtc cac cca gat ggt agc tat agc atc tcc ccc agc Val Asp Met Thr Val His Pro Asp Gly Ser Tyr Ser Ile Ser Pro Ser	576
20 25 30	
ccc ggt ggc ctt gtc acg ggg ctt tcc ccc gtt ctg gaa caa cat cgt Pro Gly Gly Leu Val Thr Gly Leu Ser Pro Val Leu Glu Gln His Arg	624
35 40 45	
gga tgt tgg gtc gga tgg cct gga act gta gat gtt gca ccc gaa cca Gly Cys Trp Val Gly Trp Pro Gly Thr Val Asp Val Ala Pro Glu Pro	672
50 55 60	
ttt cga aca gat acg ggt gtt ttg ctg cac cct gtt gtc ctc act gca Phe Arg Thr Asp Thr Gly Val Leu Leu His Pro Val Val Leu Thr Ala	720
65 70 75	
agt gac tat gaa ggc ttc tac gag ggc ttt tca aac gca acg ctg tgg Ser Asp Tyr Glu Gly Phe Tyr Glu Gly Phe Ser Asn Ala Thr Leu Trp	768
80 85 90 95	
cct ctt ttc cac gat ctg att gtt act ccg gtg tac aac acc gat tgg Pro Leu Phe His Asp Leu Ile Val Thr Pro Val Tyr Asn Thr Asp Trp	816
100 105 110	
tgg cat gcg ttt cgg gaa gta aac ctc aag ttc gct gaa gcc gtg agc Trp His Ala Phe Arg Glu Val Asn Leu Lys Phe Ala Glu Ala Val Ser	864
115 120 125	
caa gtg gcg gca cac ggt gcc act gtg tgg gtg cag gac tat cag ctg Gln Val Ala Ala His Gly Ala Thr Val Trp Val Gln Asp Tyr Gln Leu	912
130 135 140	
ttg ctg gtt cct ggc att ttg cgc cag atg cgc ctt gat ttg aag atc Leu Leu Val Pro Gly Ile Leu Arg Gln Met Arg Leu Asp Leu Lys Ile	960
145 150 155	
ggt ttc ttc ctc cac att ccc ttc cct tcc cct gat ctg ttc cgt cag Gly Phe Phe Leu His Ile Pro Phe Pro Ser Pro Asp Leu Phe Arg Gln	1008
160 165 170 175	
ctg ccg tgg cgt gaa gag att gtt cga ggc atg ctg ggc gca gat ttg Leu Pro Trp Arg Glu Glu Ile Val Arg Gly Met Leu Gly Ala Asp Leu	1056
180 185 190	
gtg gga ttc cat ttg gtt caa aac gca gaa aac ttc ctt gcg tta acc Val Gly Phe His Leu Val Gln Asn Ala Glu Asn Phe Leu Ala Leu Thr	1104
195 200 205	

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ttg cag gtc agt ggt gaa gca ttg gtg cgt gag att ggc gct cat gtt Leu Gln Val Ser Gly Glu Ala Leu Val Arg Glu Ile Gly Ala His Val 225	230	235	1200
gaa acc gct gac gga agg cga gtt agc gtc ggg gcg ttc ccg atc tcg Glu Thr Ala Asp Gly Arg Arg Val Ser Val Gly Ala Phe Pro Ile Ser 240	245	250	255
att gat gtt gaa atg ttt ggg gag gcg tcg aaa agc gcc gtt ctt gat Ile Asp Val Glu Met Phe Gly Glu Ala Ser Lys Ser Ala Val Leu Asp 260	265	270	1296
ctt tta aaa acg ctc gac gag ccg gaa acc gta ttc ctg ggc gtt gac Leu Leu Lys Thr Leu Asp Glu Pro Glu Thr Val Phe Leu Gly Val Asp 275	280	285	1344
cga ctg gac tac acc aag ggc att ttg cag cgc ctg ctt gcg ttt gag Arg Leu Asp Tyr Thr Lys Gly Ile Leu Gln Arg Leu Leu Ala Phe Glu 290	295	300	1392
gaa ctg ctg gaa tcc ggc gcg ttg gag gcc gac aaa gct gtg ttg ctg Glu Leu Leu Glu Ser Gly Ala Leu Glu Ala Asp Lys Ala Val Leu Leu 305	310	315	1440
cag gtc gcg acg cct tcg cgt gag cgc att gat cac tat cgt gtg tcg Gln Val Ala Thr Pro Ser Arg Glu Arg Ile Asp His Tyr Arg Val Ser 320	325	330	335
cgt tcg cag gtc gag gaa gcc gtc ggc cgt atc aat ggt cgt ttc ggt Arg Ser Gln Val Glu Glu Ala Val Gly Arg Ile Asn Gly Arg Phe Gly 340	345	350	1488
cgc atg ggg cgt ccc gtg gtg cat tat cta cac agg tca ttg agc aaa Arg Met Gly Arg Pro Val Val His Tyr Leu His Arg Ser Leu Ser Lys 355	360	365	1536
aat gat ctc cag gtg ctg tat acc gca gcc gat gtc atg ctg gtt acg Asn Asp Leu Gln Val Leu Tyr Thr Ala Ala Asp Val Met Leu Val Thr 370	375	380	1584
cct ttt aaa gac ggt atg aac ttg gtg gct aaa gaa ttc gtg gcc aac Pro Phe Lys Asp Gly Met Asn Leu Val Ala Lys Glu Phe Val Ala Asn 385	390	395	1632
cac cgc gac ggc act ggt gct ttg gtg ctg tcc gaa ttt gcc ggc gcg His Arg Asp Gly Thr Gly Ala Leu Val Leu Ser Glu Phe Ala Gly Ala 400	405	410	1680
			1728

gcc act gag ctg acc ggt gcg tat tta tgc aac cca ttt gat gtg gaa Ala Thr Glu Leu Thr Gly Ala Tyr Leu Cys Asn Pro Phe Asp Val Glu 420 425 430	1776
tcc atc aaa cg ^g caa atg gtg gca gct gtc cat gat ttg aag cac aat Ser Ile Lys Arg Gln Met Val Ala Ala Val His Asp Leu Lys His Asn 435 440 445	1824
ccg gaa tct gc ^g gca acg cga atg aaa acg aac agc gag cag gtc tat Pro Glu Ser Ala Ala Thr Arg Met Lys Thr Asn Ser Glu Gln Val Tyr 450 455 460	1872
acc cac gac gtc aac gtg tgg gct aat agt ttc ctg gat tgt ttg gc ^g Thr His Asp Val Asn Val Trp Ala Asn Ser Phe Leu Asp Cys Leu Ala 465 470 475	1920
cag tcg gga gaa aac tca tgaaccgcgc acgaatcg ^g accataggcg Gln Ser Gly Glu Asn Ser 480 485	1968
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Asp Met Thr Val His Pro Asp Gly Ser Tyr Ser Ile Ser Pro Ser Pro

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Cys Trp Val Gly Trp Pro Gly Thr Val Asp Val Ala Pro Glu Pro Phe
50 55 60

Arg Thr Asp Thr Gly Val Leu Leu His Pro Val Val Leu Thr Ala Ser
65 70 75 80

Asp Tyr Glu Gly Phe Tyr Glu Gly Phe Ser Asn Ala Thr Leu Trp Pro
85 90 95

Leu Phe His Asp Leu Ile Val Thr Pro Val Tyr Asn Thr Asp Trp Trp
100 105 110

His Ala Phe Arg Glu Val Asn Leu Lys Phe Ala Glu Ala Val Ser Gln
115 120 125

Val Ala Ala His Gly Ala Thr Val Trp Val Gln Asp Tyr Gln Leu Leu
130 135 140

Leu Val Pro Gly Ile Leu Arg Gln Met Arg Leu Asp Leu Lys Ile Gly
145 150 155 160

Phe Phe Leu His Ile Pro Phe Pro Ser Pro Asp Leu Phe Arg Gln Leu
165 170 175

Pro Trp Arg Glu Glu Ile Val Arg Gly Met Leu Gly Ala Asp Leu Val
180 185 190

Gly Phe His Leu Val Gln Asn Ala Glu Asn Phe Leu Ala Leu Thr Gln
195 200 205

Gln Val Ala Gly Thr Ala Gly Ser His Val Gly Gln Pro Asp Thr Leu
210 215 220

Gln Val Ser Gly Glu Ala Leu Val Arg Glu Ile Gly Ala His Val Glu

225

230

235

240

Thr Ala Asp Gly Arg Arg Val Ser Val Gly Ala Phe Pro Ile Ser Ile
245 250 255

Asp Val Glu Met Phe Gly Glu Ala Ser Lys Ser Ala Val Leu Asp Leu
260 265 270

Leu Lys Thr Leu Asp Glu Pro Glu Thr Val Phe Leu Gly Val Asp Arg
275 280 285

Leu Asp Tyr Thr Lys Gly Ile Leu Gln Arg Leu Leu Ala Phe Glu Glu
290 295 300

Leu Leu Glu Ser Gly Ala Leu Glu Ala Asp Lys Ala Val Leu Leu Gln
305 310 320

Val Ala Thr Pro Ser Arg Glu Arg Ile Asp His Tyr Arg Val Ser Arg
325 330 335

Ser Gln Val Glu Glu Ala Val Gly Arg Ile Asn Gly Arg Phe Gly Arg
340 345 350

Met Gly Arg Pro Val Val His Tyr Leu His Arg Ser Leu Ser Lys Asn
355 360 365

Asp Leu Gln Val Leu Tyr Thr Ala Ala Asp Val Met Leu Val Thr Pro
370 375 380

Phe Lys Asp Gly Met Asn Leu Val Ala Lys Glu Phe Val Ala Asn His
385 390 395 400

Arg Asp Gly Thr Gly Ala Leu Val Leu Ser Glu Phe Ala Gly Ala Ala
405 410 415

Thr Glu Leu Thr Gly Ala Tyr Leu Cys Asn Pro Phe Asp Val Glu Ser
420 425 430

Ile Lys Arg Gln Met Val Ala Ala Val His Asp Leu Lys His Asn Pro

435

440

445

Glu Ser Ala Ala Thr Arg Met Lys Thr Asn Ser Glu Gln Val Tyr Thr
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ctc att gga cct gac cgc tgg ctg atc atc gaa aag atc ttg agc gtt Leu Ile Gly Pro Asp Arg Trp Leu Ile Glu Lys Ile Leu Ser Val 270 275 280	927
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atc att gct ctt gct acc cgt cga cca ctg atc ttg gaa gac cgt ggc Ile Ile Ala Leu Ala Thr Arg Arg Pro Leu Ile Leu Glu Asp Arg Gly 750 755 760	2367
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agg ctc acc ggg caa cgc ttc agt ggt gtt gtc cca gcc acc gat ttg Arg Leu Thr Gly Gln Arg Phe Ser Gly Val Val Pro Ala Thr Asp Leu 780 785 790	2463
ttc tca cat tta ccc gta tct ttg ttg gtt tta gta ccc gat agt gag Phe Ser His Leu Pro Val Ser Leu Leu Val Leu Val Pro Asp Ser Glu 795 800 805 810	2511
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Gln Ala Asp Ser Ala Gly Arg Phe Phe Gly Phe Ala Gln Ala Lys Ala
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Gln Leu Pro Tyr Leu Lys Lys Leu Gly Ile Ser His Leu Tyr Leu Ser
35 40 45

Pro Ile Phe Thr Ala Met Pro Asp Ser Asn His Gly Tyr Asp Val Ile
50 55 60

Asp Pro Thr Ala Ile Asn Glu Glu Leu Gly Gly Met Glu Gly Leu Arg
65 70 75 80

Asp Leu Ala Ala Ala Thr His Glu Leu Gly Met Gly Ile Ile Ile Asp
85 90 95

Ile Val Pro Asn His Leu Gly Val Ala Val Pro His Leu Asn Pro Trp
100 105 110

Trp Trp Asp Val Leu Lys Asn Gly Lys Asp Ser Ala Phe Glu Phe Tyr
115 120 125

Phe Asp Ile Asp Trp His Glu Asp Asn Gly Ser Gly Gly Lys Leu Gly
130 135 140

Met Pro Ile Leu Gly Ala Glu Gly Asp Glu Asp Lys Leu Glu Phe Ala
145 150 155 160

Glu Leu Asp Gly Glu Lys Val Leu Lys Tyr Phe Asp His Leu Phe Pro
165 170 175

Ile Ala Pro Gly Thr Glu Glu Gly Thr Pro Gln Glu Val Tyr Lys Arg
180 185 190

Gln His Tyr Arg Leu Gln Phe Trp Arg Asp Gly Val Ile Asn Phe Arg
195 200 205

Arg Phe Phe Ser Val Asn Thr Leu Ala Gly Ile Arg Gln Glu Asp Pro
210 215 220

Leu Val Phe Glu His Thr His Arg Leu Leu Arg Glu Leu Val Ala Glu
225 230 235 240

Asp Leu Ile Asp Gly Val Arg Val Asp His Pro Asp Gly Leu Ser Asp
245 250 255

Pro Phe Gly Tyr Leu His Arg Leu Arg Asp Leu Ile Gly Pro Asp Arg
260 265 270

Trp Leu Ile Ile Glu Lys Ile Leu Ser Val Asp Glu Pro Leu Asp Pro
275 280 285

Arg Leu Ala Val Asp Gly Thr Thr Gly Tyr Asp Pro Leu Arg Glu Leu
290 295 300

Asp Gly Val Phe Ile Ser Arg Glu Ser Glu Asp Lys Phe Ser Met Leu
305 310 315 320

Ala Leu Thr His Ser Gly Ser Thr Trp Asp Glu Arg Ala Leu Lys Ser
325 330 335

Thr Glu Glu Ser Leu Lys Arg Val Val Ala Gln Gln Glu Leu Ala Ala
340 345 350

Glu Ile Leu Arg Leu Ala Arg Ala Met Arg Arg Asp Asn Phe Ser Thr
355 360 365

Ala Gly Thr Asn Val Thr Glu Asp Lys Leu Ser Glu Thr Ile Ile Glu
370 375 380

Leu Val Ala Ala Met Pro Val Tyr Arg Ala Asp Tyr Ile Ser Leu Ser
385 390 395 400

Arg Thr Thr Ala Thr Val Ile Ala Glu Met Ser Lys Arg Phe Pro Ser
405 410 415

Arg Arg Asp Ala Leu Asp Leu Ile Ser Ala Ala Leu Leu Gly Asn Gly
420 425 430

Glu Ala Lys Ile Arg Phe Ala Gln Val Cys Gly Ala Val Met Ala Lys
435 440 445

Gly Val Glu Asp Thr Thr Phe Tyr Arg Ala Ser Arg Leu Val Ala Leu
450 455 460

Gln Glu Val Gly Gly Ala Pro Gly Arg Phe Gly Val Ser Ala Ala Glu
465 470 475 480

Phe His Leu Leu Gln Glu Glu Arg Ser Leu Leu Trp Pro Arg Thr Met
485 490 495

Thr Thr Leu Ser Thr His Asp Thr Lys Arg Gly Glu Asp Thr Arg Ala
500 505 510

Arg Ile Ile Ser Leu Ser Glu Val Pro Asp Met Tyr Ser Glu Leu Val
515 520 525

Asn Arg Val Phe Ala Val Leu Pro Ala Pro Asp Gly Ala Thr Gly Ser
530 535 540

Phe Leu Leu Gln Asn Leu Leu Gly Val Trp Pro Ala Asp Gly Val Ile
545 550 555 560

Thr Asp Ala Leu Arg Asp Arg Phe Arg Glu Tyr Ala Leu Lys Ala Ile
565 570 575

Arg Glu Ala Ser Thr Lys Thr Trp Val Asp Pro Asn Glu Ser Phe
580 585 590

Glu Ala Ala Val Cys Asp Trp Val Glu Ala Leu Phe Asp Gly Pro Ser
595 600 605

Thr Ser Leu Ile Thr Glu Phe Val Ser His Ile Asn Arg Gly Ser Val
610 615 620

Asn Ile Ser Leu Gly Arg Lys Leu Leu Gln Met Val Gly Ala Gly Ile
625 630 635 640

Pro Asp Thr Tyr Gln Gly Thr Glu Phe Leu Glu Asp Ser Leu Val Asp
645 650 655

Pro Asp Asn Arg Arg Phe Val Asp Tyr Thr Ala Arg Glu Gln Val Leu
660 665 670

Glu Arg Leu Gln Thr Trp Asp Trp Thr Gln Val Asn Ser Val Glu Asp
675 680 685

Leu Val Asp Asn Ala Asp Ile Ala Lys Met Ala Val Val His Lys Ser
690 695 700

Leu Glu Leu Arg Ala Glu Phe Arg Ala Ser Phe Val Gly Gly Asp His
705 710 715 720

Gln Ala Val Phe Gly Glu Gly Arg Ala Glu Ser His Ile Met Gly Ile
725 730 735

Ala Arg Gly Thr Asp Arg Asn His Leu Asn Ile Ile Ala Leu Ala Thr
740 745 750

Arg Arg Pro Leu Ile Leu Glu Asp Arg Gly Gly Trp Tyr Asp Thr Thr
755 760 765

Val Thr Leu Pro Gly Gly Gln Trp Glu Asp Arg Leu Thr Gly Gln Arg
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